

Fault-Tolerant Precision Formation Guidance for Interferometry, Phase I

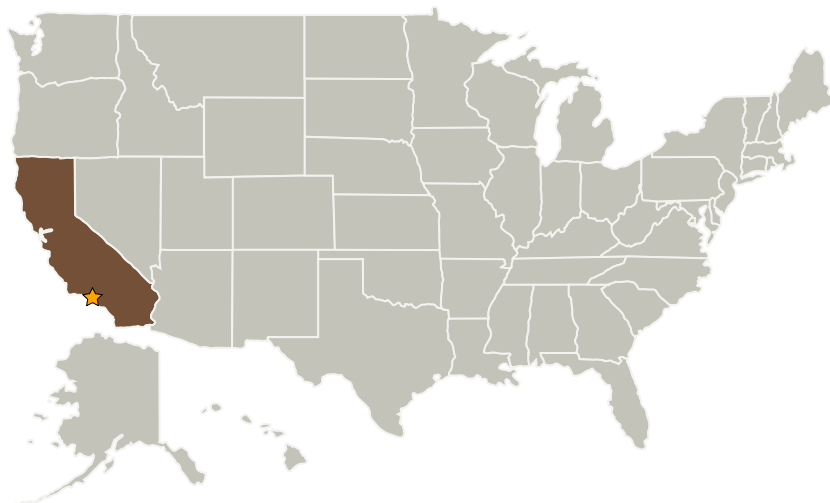
Completed Technology Project (2006 - 2006)



Project Introduction

A methodology is to be developed that will allow the development and implementation of fault-tolerant control system for distributed collaborative spacecraft. The objective is to ensure that the cluster of spacecraft continue to meet high precision performance objectives in the presence of system faults and uncertainty. The proposed innovation is the development of a fault-tolerant control system for distributed spacecraft. The development process begins with fault-tolerant control system architecture and then the analysis of its performance. The essential elements of this proposed fault-tolerant control system architecture are: The fault detection filters and parity equations that generate residuals (the difference between the actual measurement and the estimated value) with important geometrical properties that enhance fault detection and identification. The residual processor that takes these corrupted residuals and announces a fault with a given probability of false and miss alarm in minimal time. A fault reconstruction system that estimates the fault magnitude once the fault has been identified. A distributed control system that reconfigures based on the particular fault and the fault magnitude.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
SySense, Inc.	Supporting Organization	Industry	El Segundo, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
 - └ TX17.5 GN&C Systems Engineering Technologies
 - └ TX17.5.2 GN&C Fault Management / Fault Tolerance / Autonomy